Statement of Purpose

It is a purpose of this analysis to provide a context for discussion of expected demand for development and the risk of degradation of natural and cultural resources due to existing or potential development. Existing land use and soil conditions in the Ashuelot River Corridor were analyzed to provide the Ashuelot River Local Advisory Committee with an understanding of the current and possible future conditions of development in the Corridor. The Committee will use this analysis as part of a planning effort to guide change in the Corridor with a goal of minimizing loss of resources and maximizing resource values.

Approach

Land Use

Land use was inventoried for the project area which is the land area within 1/2-mile of each river bank. The inventory was conducted during Summer 1997. ArcInfo™ Geographic Information System (GIS) was used to quantify the observed land use.

Existing land use was inventoried by field observation during 1997. Identified land uses were recorded on municipal tax maps (a.k.a. parcel maps). Observed land uses were classified using a conventional classification scheme: Single-Family Residential, Commercial, Industrial, Public/Institutional[1], Active Agriculture, Conservation, Other Undeveloped, and Mixed-Use Village Development (several contiguous developed properties, each less than 5 acres). For the purposes of this analysis land use was measured to determine the amount of land currently under the influence of development. The phrase "under the influence of development" means the alteration of natural conditions, principally under the precepts of hydrology and ecology. Alterations may include alteration of topography and drainage patterns, introduction of impervious surfaces and alteration of infiltration and runoff rates, deforestation or other alteration of vegetation, displacement of natural plant and animal communities, and introduction of exotic species or pollutants. Also, the affects of contiguous development were accounted for by quantifying land use of contiguous developed properties differently from single developed properties isolated among undeveloped properties.

The Mixed-Use Village Development class was used to indicate areas of dense residential and/or commercial land use. These areas are generally considered to be potential non-point source pollution threats due to a concentration of household and landscaping chemicals, motor vehicles, and the possibility of other chemicals used in business and industry.

On developed properties less than five acres in size, the land use was ascribed to the entire property, that is the entire property was considered to be under the influence of the type of development observed there. On properties larger than five acres, observed land use was ascribed to an area of influence less than the total property area as either a default of two acres or some other areal extent meant to approximate actual area of influence based on field observation. The two-acre default was typically used for single-family homes in a rural setting.

[1] public/institutional = local, state or federal government uses; or; tax exempt organizational uses, e.g. fraternal organization, church, or historical society

The land use inventory and tax maps were automated as GIS data bases. Land use was quantified as acres by class, by count of properties by class, and as a percent of total Corridor land area. The land use inventory was also presented in a map: "Existing Land Use of the Ashuelot River Corridor."

Soil Conditions

Information on soil conditions and other landscape variables that are known to impose limitations on development as reported by the USDA Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service) 1984 Soil Surveys for Cheshire County was analyzed for the study area using ArcInfo™ Geographic Information System. Soil conditions are used here as indicators of limitations to or favorability for future development.

This analysis is based on the NRCS tables that qualify soils for limitations to "Building Site Development," "Sanitary Facilities," and Woodland Management." Each of these tables qualify soil types by an array of subordinate variables as follow:

Building Site Development

Soil	Shallow Excavation	Dwellings without Basements	Dwellings with Basements	Small Commercial Buildings	Local Roads and Streets	Lawns and Landscaping
76B Marlow	Moderate: dense layer	Slight	Moderate: wetness	Moderate: slope	Moderate: frost action	Slight

Sample entry from table 10. Cheshire Co.

NRCS Survey Soil Unit Code and Name. The Unit Code indicates the type of Soil by number (76). There are 264 different soil types in the Corridor. The Code also indicates the slope of land by letter, generally as: A= 0-5%, B= 5-8%, C=8-15%, D=15-25%, E > 25%.

Slight = generally favorable to development; Moderate = some special considerations may be required to overcome limitations; Severe = substantial costs and other special considerations may be required to overcome limitations of soil conditions or site features

These descriptors of soil or site limitations were not used in this analysis.

Sanitary Facilities

Soil	Septic tank absorption field	Sewage lagoon areas
76B Marlow	Severe: percs slowly	Moderate: seepage, slope

Sample entry from table 11. Cheshire Co.

Suitability for lagoons was not used in this analysis.

Woodland Management

Soil	Erosion	Equipment	Seedling	Windthrow	Plant

		Hazard	Limitations	Mortality	Hazard	Competition
Sample entry from table 7. Cheshire Co.	75B Marlow	Slight	Slight	Slight	Moderate	Moderate

NOTE: Table 7. Woodland Management and Productivity appearing in the Soil Survey contains fields not shown or used here: Ordination Symbol, Common Trees, Site Index, Productivity Class, and Trees to Plant.

A score was calculated for each soil type for each of the three variables: Building Site Development, Sanitary Facilities, and Woodland Management:

1. Scores were calculated by assigning the values 0, 50, and 100 to the qualifiers slight, moderate, and severe, respectively.
2. Average scores were calculated for each soil type within each table.
3. Average scores for each soil type within each variable were reclassified as slight, moderate or severe using a natural groupings algorithm for each variable as shown below.

Variable	Score	Reclassification
Building Site Development	0 - 50	Slight
	51 - 65	Moderate
	66 - 100	Severe
Sanitary Facilities *	0	Slight
	50	Moderate
	100	Severe
Woodland Management	0 - 20	Slight
	21 - 60	Moderate
	61 - 100	Severe

* Single scores were used here due to soils being qualified for only one subordinate variable: septic tank absorption field.

The qualifiers “slight,” “moderate,” and “severe” indicate a level of effort required to accomplish the specified activity, such as site development, timber harvest, or installation of a septic absorption field. That effort may be required during or after construction and may include special considerations regarding engineering, construction, maintenance, or cost of a project. These qualifiers may also provide an indication of the level of risk of environmental damage, including loss of soil potential, loss of soil, and contamination of ground or surface waters, as a result of a specified activity. The qualification of a soil type as having slight limitations to building site development does not free a developer from soil erosion control practices before or after construction and likewise a severe limitation does not mean that construction there is not possible, only that special considerations or precautions will be necessary.

Reclassified soils were analyzed for arial extent as acres and as percent of Corridor land area. The results of this soils analysis were also presented in a map series for the Ashuelot River Corridor.

Findings

The total area of the Ashuelot River Corridor is 52,486 acres. This includes 3,455 acres of surface water (rivers, streams, lakes and ponds) and about 4,069 acres of wetlands, leaving about 44,962 acres of land.

Land Use

The land use inventory revealed that about 51**%** of the Corridor land area is currently undeveloped. Public and institutional lands was the most extensive land use, occupying 10,405 acres (48% of all developed land) within the Corridor. Residential development occupied 7,438 acres (34% of developed land) with 852 properties involved while Mixed-use village development occupied only 708 acres (4% of developed land) but involved 1,582 properties. Active Agriculture occupied 2,243 acres (10% of developed land) of land on 77 properties. Results of the inventory are shown in Figure 1. and the map: "Ashuelot River Corridor Existing Land Use Summer 1997."

Inspection of the land use inventory map shows that most development occurs within several hundred feet of state and major local roads. Village development tends to be adjacent to the Ashuelot River. Eight of the ten Corridor municipalities have their village centers adjacent to, if not centered on the Ashuelot River, with Washington and Lempster being the exceptions. That part of the City of Keene found within the Corridor represents the largest single extent of Mixed-Use Village Development in the Corridor. West Swanzey, Winchester, and Hinsdale also have well-defined village areas with residential, commercial and industrial land use in the Corridor.

Active agriculture occurs in only several isolated patches of considerable size. Most of the 2,243 acres of active agricultural land in the Corridor is attributable to three areas: hay production in the U.S. Army Corps Surry Mountain Flood Control land; corn and some vegetable production north and west of downtown Keene; hay and pasture on the Brown farm in West Swanzey; and pasture, hay and corn production in Winchester. Scattered small hay fields and pastures are common in the Corridor but represent a small percentage of the Corridor land use and land area.

Public land use accounts for about 48% of the Corridor developed land and 23% of the Corridor land area. These lands include municipal, state and federal property as well as other tax exempt properties such as churches. The Surry Mountain Flood Control reservoir and attendant recreation area represents a considerable part of the lands under public land use. The extent of the City of Keene's public recreation land in the Corridor also warrants notice.

An additional variable investigated in the land use study was the extent and distribution of lands subject to some sort of legalistic restrictions on future development, conventionally known as conservation lands. A query of the NH GRANIT 1994 "Protected Lands" data base provided information shown in Figure 1. and Figure 2.: 9,474 acres of land in the Corridor are under some sort of conservation restriction, which represents 21% of the total land area. There is caveat about the conservation data to be understood, that being that one category of "protection" in the

GRANIT data base is lands under public ownership. Some of those lands are truly conservation lands, such as state and municipal parks. This category also includes lands that are in public ownership for a variety of other reasons and may be subject to development by the public or disposal to private ownership and subsequent development.

Soil Conditions

The soils analysis results are presented in Figure 3. as the number of acres by class and level of limitations, and as percent of total land area by class and level of limitations. NOTE: the land area for the soils analysis is not equivalent to that for the land use study due to the absence of Sullivan County soils data.

The vast majority of land area is considered to have severe limitations to building site development (80%), installation septic tank absorption fields (90%), and woodland management activity (83%). The soils analysis map series illustrates well the vast extent of these restrictions. The presence of high water table, steep slope, shallow bedrock, and/or susceptibility to erosion are the principal environmental factors responsible for the severe limitations.

Land with moderate or slight limitations together represent between 10% and 20% of the Corridor land area. Land with moderate limitations tends to occur in areas that are currently developed, particularly as village areas. Soils with moderate limitations tend to occur on low lying, low relief lands of the valley floor. Soils with slight limitations tend to occur sporadically as isolated patches of 5 to 50 acres.

Summary

The findings of this study indicate that existing development with attendant environmental impacts tends to occur near the Ashuelot River rather than in upland areas within the Corridor. Commercial and industrial development is infrequent outside Village areas. Residential development is evenly distributed along roads in the Corridor, especially from Marlow village south. With this distribution comes equally evenly distributed environmental impacts.

The distribution of existing land use reflects the findings of the soil analysis: much of the Corridor has some limitations to development. Development is concentrated in areas with slight or moderate limitations. Throughout much of the Corridor, large areas currently absent of development are coincidentally known to have limitations to development principally imposed by steep slopes and wetlands.

Measuring the extent and magnitude of existing development and limitations to development imposed by soil conditions should be part of public and private decisions about the appropriateness of land use types and densities throughout the Corridor as well as a being a basis for developing and implementing environmental management tools. For example, the Ashuelot River Local Advisory Committee has identified a need for non-point source pollution prevention in the Corridor. The findings of this study can be used to work with local officials and property owners to develop prevention measures where an imminent need is identified.

The land use and environmental conditions studied here are sound basic indicators for guiding environmental management decisions and land use controls. There are other equally influential factors which affect existing conditions and will be principal determinants of future development conditions: decision-making of private land owners and the prevailing economic environment. Much of the land area of the upper Corridor is undeveloped and under private ownership as large properties (measured in the 100's and even 1,000's of acres). The fate of privately owned undeveloped land is ultimately in the hands of the owners. None of the information provided in this study indicates that development of currently undeveloped land or increased development densities on currently developed land is impossible. The appropriateness of development and the implementation of land use controls and environmental management tools are public policy decisions and, as such, rely on a shared belief among the general public of a need for control or management.